Maths

Instructional Programme

Rationale

Basic skills are the building blocks of all mathematical concepts. At St. Patrick's, we recognise this and aim for all children to be fluent in basic mathematical principles so that they then have the tools to tackle more difficult problems.

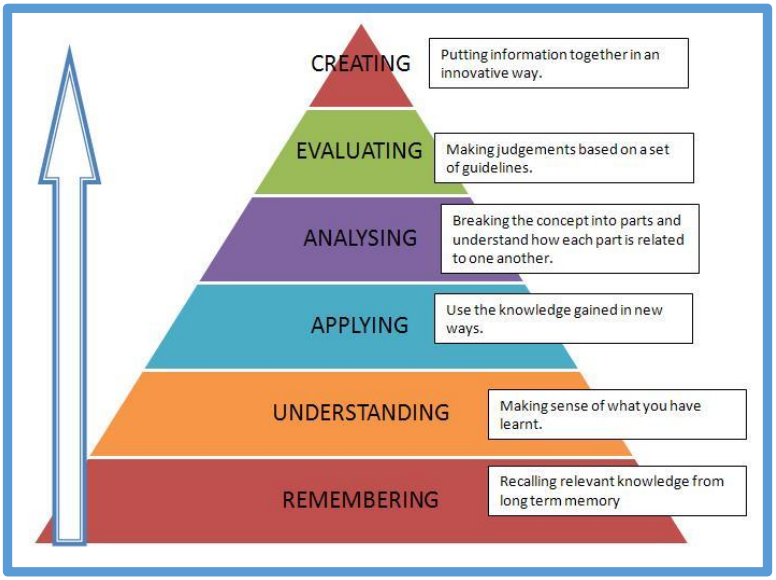
St. Patrick teachers ensure that all basic skills are taught methodically using consistency and logic when modelling processes. This ensures that children have a clear understanding of concepts.

When children understand these methods, our curriculum provides them with the opportunity to practise these concepts. This has been achieved through the development of **Non-Negotiables.** This has been developed for St. Patrick's teachers specifically for our children. Teachers identified the most important basic skills for our children to master - fluently - by the end of each academic year. Thus, all children are given the opportunity to practise these daily to promote rapid recall.

Psychologist Siddiqu relates this to multiplication facts: "If a child has memorised the multiplication tables, it could be argued that they have freed up working memory that can be replaced by new facts and information. [This then] speeds up the problem-solving process," she says.

In other words, if children aren't able to recall their times tables automatically, they will need to take the additional step of multiplying out the numbers in the process of solving a problem. Hence, unconscious recall gives children the capacity to tackle more difficult concepts.

Bloom's Taxonomy outlines levels of understanding and analysis.



Using this in maths, we have developed our maths curriculum around 2 key areas:

1. Non-Negotiables (Remembering and Understanding)

2. Visualisation and Jottings (Applying and Analysing)

Non-Negotiables

At St. Patrick's we have identified that children should be able to have fluent recall of the following Non-Negotiables:

Year R - Recognise the numbers 0 – 20 in and out of sequence. - Count forwards and backwards to 20 starting from any number. - To know which number is one more or one less than a given number. - To add and subtract two single digit numbers. - To solve problems using doubling, halving and sharing. - To compare two quantities (weight, capacity, position, distance, size) verbally.
Year R in Summer Term (after moderation) - Practise counting to 100 using songs or just chanting as a class. - To write all of the numbers up to 10. - Identify and represent numbers using tens frame/Numicon/multilink. - To introduce the part whole model.
Year 1 - Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. - Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens. - Identify one more or one less than any given number. . - Identify and represent numbers using objects and pictorial representations and use language of: equal to, more than, less than (fewer), most, least. - Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. - Represent and use number bonds up to and including 10.
Year 2 - Count in steps of 2, 3, and 5 from 0, and in tens from any numbers, forward and backward. - Recognise the place value in each digit in a two-digit numbers (tens, ones). - Identify and represent numbers using different representations. - Compare and order numbers from 0 up to 100; use <, > and = signs. - Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up

to 100.
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Recognise, find, name and write 1/3, ¼, 2/4 and ¾ of a length, shape, set of objects or quantity.

Year 3
- Count from 0 in multiples of 4, 8, 50 and 100.
- Find 10 or 100 more or less than a given number.
- Recognise the place value in three digit numbers.
- Identify three digit numbers using different representations.
- Add and subtract numbers mentally (3 digit by ones, tens and hundreds)
- Add and subtract numbers with up to three digits using a formal written method.
- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- Add and subtract fractions with the same denominator.
-Estimate and read time with increasing accuracy to the nearest minute.

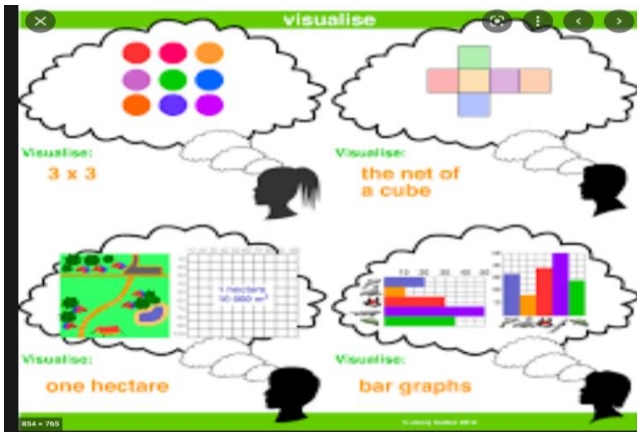
Year 4
- Recognise the place value in four digit numbers.
- Identify four digit numbers using different representations.
- Round any number to the nearest 10, 100 and 1000.
- Add and subtract numbers with up to 4 digits using a formal written method.
- Recall multiplication and division facts for multiplication tables up to 12 x 12.
- Multiply two and three digit by one digit number using a formal written method.
- Recognise and show, using diagrams, families of common equivalent fractions.
- Recognise and write decimal equivalents to ¼, ½ and ¾.
- Read, write and convert time between analogue and digital 12 and 24 hour clocks.

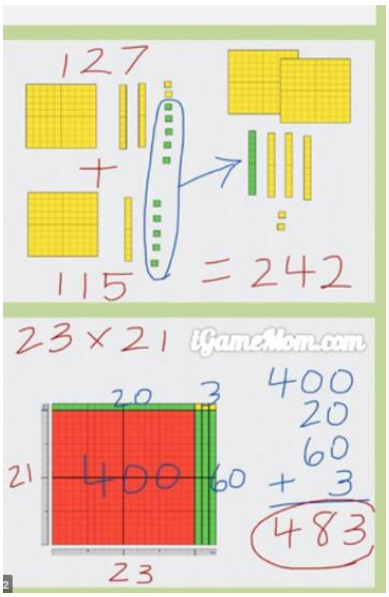
Year 5
- Recognise the place value in numbers up to one million.
- Add and subtract whole numbers with more than 4 digits, including using formal written methods.
- Add and subtract numbers mentally with increasingly large numbers.
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Read, write, order and compare numbers with up to three decimal places.
- Read and write decimal numbers as fractions.

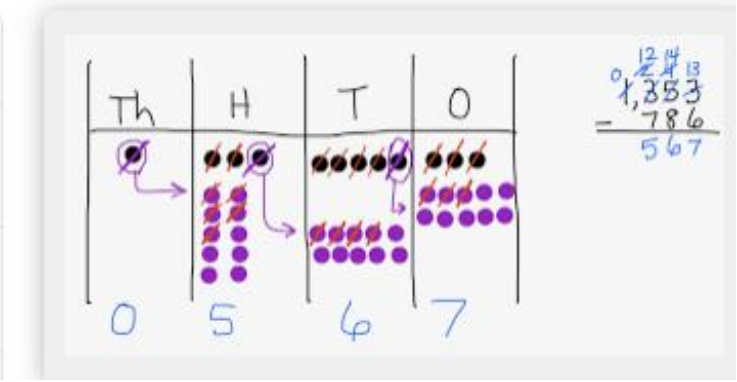
Year 6

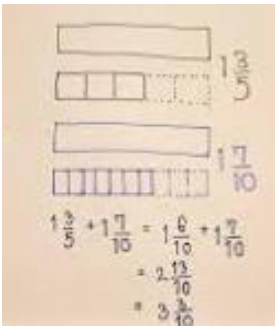
All of the above

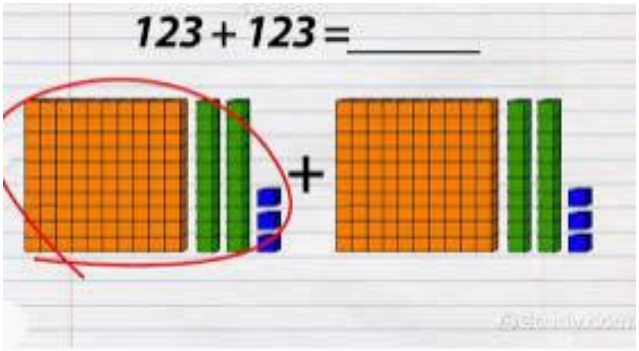
Visualisation and Jotting Examples

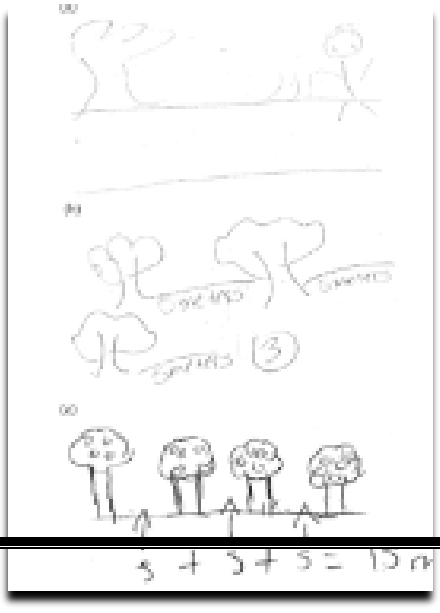


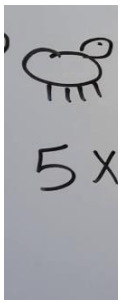


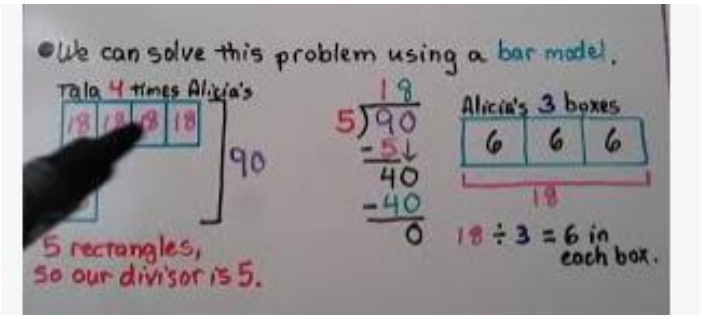


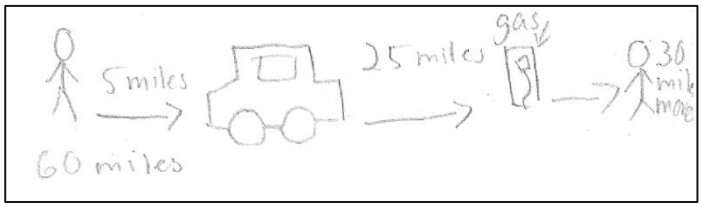






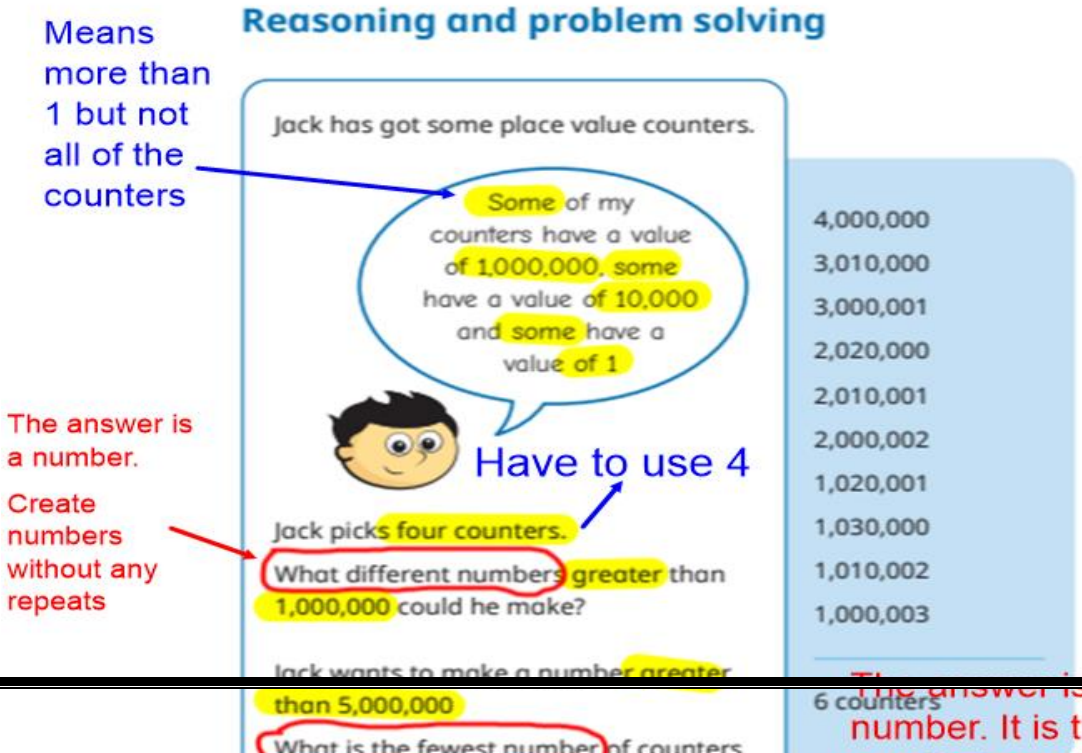




How 

To Use Power Maths

1. Before teaching each lesson, from Power Maths, look at the basic skills that are needed within each lesson
2. Plan a formative assessment activity to identify what children can and can't do.
3. Teach each of these basic skills, before moving onto the Power Maths textbook in class
4. Model the lesson's learning to the class so children can start the Power Maths activities. Identify children who will need additional support and create cut away group if needed
5. Marking should be chunked throughout the lesson ensuring misconceptions are promptly identified and intervened
6. Challenge activities e.g. 'Einstein's Challenge' – additional to Power Maths from White Rose Resources– should be available for each lesson
7. These challenge activities should be reasoning activities that apply all the taught basic skills from this lesson
8. Reasoning challenges should be used as a teaching tool at either the beginning of the next lesson or end of each lesson
9. The following success criteria should be used for reasoning style word problem



What steps can I use to understand the question?

1. Read the question.
2. Circle the **question phrase**.
   This tells you **what** your answer should be e.g. 'How many, What date, Which month, What number, How many mm of rain…'
3. Next, highlight the key vocabulary.
   This will help you to **identify which process** is required e.g. 'more than, less than, the difference…'
4. Use **visualisation** to see what is happening in your mind's eye.
5. Use **jottings to draw** this.
6. Over model, over practice and over teach.

At the start of the day Gemma had £574.
For her birthday Gemma received £297.
How much money does she have in total?

Total	
Money at the start £574	Birthday money £297

$$\begin{array}{r} 574 \\ +\ 297 \\ \hline 871 \\ \hline \end{array}$$

Formative Assessment for lesson

Should be ongoing throughout the lesson using misconceptions identified and diagnostic questioning throughout

1. Whiteboards.
2. Checkpoints.
3. Red, Amber, Green cards.
4. Peer Marking.

Lesson Structure

1. X tables 'practising' and 'teaching' to begin each lesson.
2. Starter to recap on previous learning feeding into the weekly review.
3. Teaching and over modelling of skills needed to complete lesson tasks.
4. Ensure logical and repeated method is modelled.
5. FA of basic skills needed to complete the lesson's tasks.
6. Cutaway children who need to continue to work on basic skills, before moving onto main lesson.
7. Throughout, check children's understanding and bring children to the front who are finding difficulty.
8. Children – who are successfully finished – move onto Einstein's Challenges
9. At the end of this lesson, or beginning of the next, these challenges should be done as a class through systematic modelling as set out above in 'What steps can I use to answer the question?'

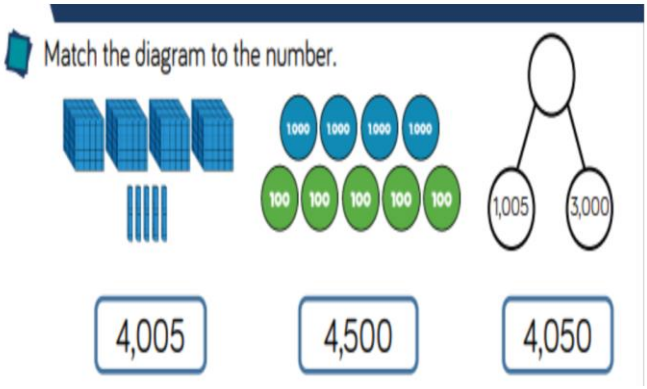
21/09/21

LO: to use numbers up to 1,000,000

Can you show me 8045 in 3 different ways?

Write the value of the DIGIT underlined.

1) 2,120
2) 406,342
3) 993,627
4) 832,451
5) 62, 752



Einstein Challenge

Here are four number cards.

2	3	4	7

Layla uses each card once to make a four-digit number.

She places:

- 4 in the tens column
- 2 so that it has a higher value than any of the other digits
- the remaining two digits so that 7 has the higher value.

Write a digit in each box to show Layla's number.

1. Clear number formation.
2. Neat and ordered.
3. Logical sequence.
4. Repeatable with clear steps to follow.

Can you round to the nearest hundred?

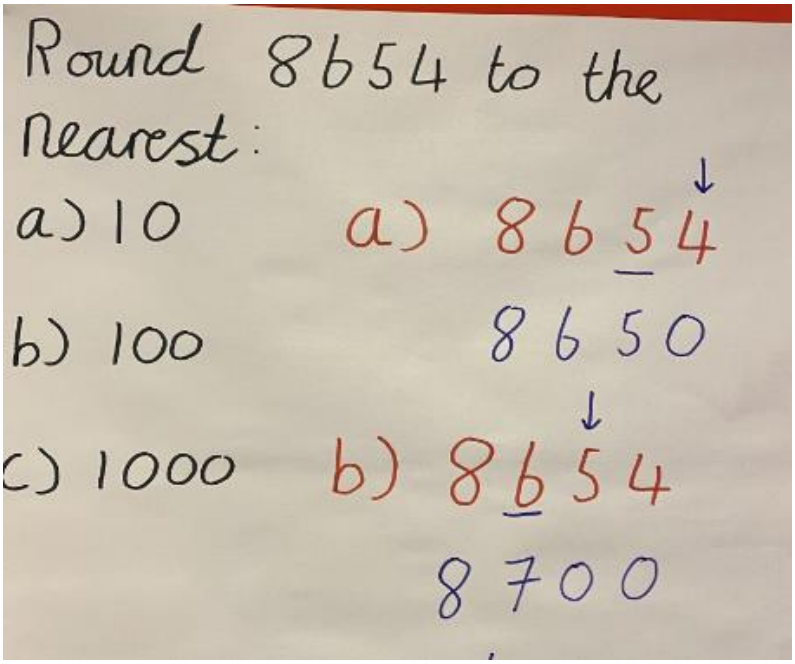
1) Underline the place value column we are rounding to.

2) Look next door. Do I round up or down?

31782

31800

What do you notice about the numbers before and after the hundred?



Starters/Weekly Review

1. Should be at the start of all maths lessons after times tables practise with a formal 'Weekly Review' once a week.
2. Can be anywhere between 15-30 minutes depending on what misconceptions are found
3. Should recap non-negotiables, previous learning from the topic you are working on, previous learning from the topic just been and previous learning from any time in the year
4. These questions should be the same for 3-4 lessons, finishing with a weekly review
5. Children will complete on whiteboards with the teacher picking up and teaching any misconceptions found
6. Teacher should mark the 'Weekly Review', using this as an indicator for what questions to choose for the next week
7. Children should have a chance to fix mistakes in green pen. Teachers can provide scaffolds to help children overcome any misconceptions they made

Weekly Review

1) 12374 - 5852

2) Round 23538 to the nearest:

a) 10

b) 100

c) 1000

3) Put the following in ascending order:

0.98, 980, 1205, 9.65, 12, 128, 9345

4) 2486 x 34

5) $4\overline{)817}$

6) $\frac{4}{5} - \frac{1}{3} =$